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Japanese (PDF)

File Wrapper Information

[Translation done.]

FULL CONTENTS CLAIM + DETAILED DESCRIPTION TECHNICAL FIELD
PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS
EXAMPLE

[Translation done.]

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Notes:

1. Untranslatable words are replaced with asterisks (***).
2. Texts in the figures are not translated and shown as it is.

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Dictionary: Last updated 03/23/2009 / Priority: 1. Chemistry / 2. Mechanical engineering / 3. Technical terms

FULL CONTENTS**[Claim(s)]**

[Claim 1](a) Olefin system copolymer rubber 100 weight section, (b) peroxide decomposition type olefin system resin 15 - 150 weight sections, (c) A thermoplastic elastomer composition which carries out melt kneading treatment of the constituent containing 0.01 to organic peroxide 3 weight section and (d) ester system bridge formation assistant 0.01 - ten weight sections, and is characterized by things.

[Claim 2](a) The thermoplastic elastomer composition according to claim 1 whose ethylene content crystallinity of polyethylene according [olefin system copolymer rubber] to DSC measurement is 20 or less weight %, and is 40 to 70 weight %.

[Claim 3](d) The thermoplastic elastomer composition according to claim 1 or 2, wherein an ester system bridge formation assistant is a polyfunctional acrylate compound or a polyfunctional methacrylate compound.

[Claim 4](e) A thermoplastic elastomer composition given in any 1 paragraph of Claims 1-3 containing further a conjugated diene system copolymer and/or its **** conjugated diene system copolymer 1 - 100 weight sections.

[Claim 5](f) A thermoplastic elastomer composition given in any 1 paragraph of Claims 1-4 containing [one to softener 100 weight section for non-aromatic system rubber, and also].

[Claim 6](g) A thermoplastic elastomer composition given in any 1 paragraph of Claims 1-5 containing further one to silicone oil 20 weight section.

[Claim 7](h) A thermoplastic elastomer composition given in any 1 paragraph of Claims 1-6 containing further the inorganic bulking agent 1 - 150 weight sections.

[Claim 8]An automatic exterior member in the car and a building component which carry out the fabricating operation of the thermoplastic elastomer composition of a description to any 1 paragraph of Claims 1-7, and are characterized by things, or a household appliance member.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]Especially this invention relates to the thermoplastic elastomer composition which is excellent in multilayer extrusion moldability, bleeding-proof nature, heat-resistant modification nature, oil resistance, and a sex with a crack-proof about a thermoplastic elastomer composition.

[0002]

[Description of the Prior Art]In recent years, it is the elasticity material which has rubber elasticity, and a vulcanization step is not needed but the thermoplastic elastomer in which the same molding workability and recycling as thermoplastics are possible is used abundantly in the field of autoparts, household appliance parts, a wire covering, a medical part, footwear, general merchandise, etc.

[0003]The polystyrene system thermoplastic elastomer which is the block copolymers of a vinyl aromatic compound-conjugated diene compound also in thermoplastic elastomer, such as styrene butadiene block polymer (SBS) and styrene isoprene block polymer (SIS), is rich in plasticity, The thermoplastic elastomer composition which has good rubber elasticity at ordinary temperature, and is obtained from these is excellent in workability.

It is widely used as a substitute of vulcanized rubber.

[0004]The elastomer composition which hydrogenated the intramolecular double bond of styrene in these elastomers and the block copolymer of conjugated diene is used abundantly still more widely as an elastomer which raised heat-resistant aging nature (thermal stability) and weatherability.

[0005][however the thermoplastic elastomer composition using these hydrogenation block copolymers] [as what there is still a problem in rubber characteristics, for example, oil resistance, and the heat pressing reduction of area (compression set) and the rubber elasticity at the time of an elevated temperature, and improves this point] The bridge formation object acquired by making the constituent containing the hydrogenation derivative of the above-mentioned block copolymer construct a bridge is proposed (for example, JP,S59-6236,A, JP,S63-57662,A, JP,H3-49927,B, JP,H3-11291, B, and JP,H6-13628,B).

[0006]The actual condition is not having reached the engine-performance level which especially the bridge formation constituent of the ***** block copolymer currently indicated by the above-mentioned gazette has the problem the compression set at 100 ** being still insufficient at the time of an elevated temperature, and machinery hardness falling easily, and is conventionally demanded for the vulcanized rubber use. That shape retentivity gets worse in extrusion since the melt tension at the time of an elevated temperature is low, and a molding cycle becomes long in injection molding etc. also has many problems of a fabricating-operation side.

[0007]Although each constituent indicated by the above-mentioned gazette is 40 or more in the Shore A hardness and it is made to soften by increasing the quantity of the addition of a softener, The actual condition is in this case, smeariness's occurring on the mold-goods surface, or producing the bleed out of a softener under a heating stress, and including practically undesirably the problem of being inferior to bleed out-proof nature, in the skin material or core material of an automatic exterior member in the car especially.

[0008]

[Problem to be solved by the invention]An object of this invention is to provide the thermoplastic elastomer composition for the inner exterior member of the car which is excellent in multilayer extrusion (injection) moldability, bleeding-proof nature, a heat-resistant deformable (compression set) one, oil resistance, and a sex with a crack-proof, a building component, or household appliance members in view of the above-mentioned problem.

[0009]

[Means for solving problem]As a result of repeating research wholeheartedly that this invention persons should attain the above-mentioned purpose, [by carrying out melt kneading treatment of the peroxide decomposition type olefin system resin to olefin system copolymer rubber under existence of organic peroxide of a specific amount and an ester system bridge formation assistant] It found out that a thermoplastic elastomer composition which is excellent in plasticity, bleeding-proof nature, and multilayer extrusion (injection) moldability was obtained, and this invention was completed.

[0010]An invention of the 1st of this invention Namely, (a) olefin system copolymer rubber 100 weight section, (b) It is a thermoplastic elastomer composition which carries out melt kneading treatment of the constituent containing 15 to peroxide decomposition type olefin system resin 150 weight section, (c) organic peroxide 0.01 - three weight sections and (d) ester system bridge formation assistant 0.01 - ten weight sections, and is characterized by things.

[0011]An invention of the 2nd of this invention is a thermoplastic elastomer composition given in an invention of the 1st of this invention whose ethylene content crystallinity of polyethylene according [(a) olefin system copolymer rubber] to DSC measurement is 20 or less weight %, and is 40 to 70 weight %.

[0012]An invention of the 3rd of this invention is a thermoplastic elastomer composition given in the 1st of this invention or an invention of 2, wherein (d) ester system bridge formation assistant is a polyfunctional acrylate compound or a polyfunctional methacrylate compound.

[0013]An invention of the 4th of this invention is a thermoplastic elastomer composition given in an invention of the 1-3rd either of this inventions containing further (e) conjugated diene system copolymer and/or the **** conjugated diene system copolymer 1 - 100 weight sections.

[0014]An invention of the 5th of this invention is a thermoplastic elastomer composition given in an invention of the 1-4th either of this inventions containing [the softener 1 for (f) non-aromatic system rubber - 100 weight sections, and also].

[0015]An invention of the 6th of this invention is a thermoplastic elastomer composition given in an invention of the 1-5th either of this inventions containing further the (g) silicone oil 1 - 20 weight sections.

[0016]An invention of the 7th of this invention is a thermoplastic elastomer composition given in an invention of the 1-6th either of this inventions containing further the (h) inorganic bulking agent 1 - 150 weight sections.

[0017]An invention of the 8th of this invention carries out the fabricating operation of the thermoplastic elastomer composition of a description to an invention of the 1-7th either of this inventions, and they are an automatic exterior member in the car and a building component which are characterized by things, or a household appliance member.

[0018]

[Mode for carrying out the invention]A component, a manufacturing method, and a use which constitute this invention are explained in detail below.

[0019]1. Composition component (1) olefin-system copolymer rubber of thermoplastic elastomer composition (a)

[an olefin system copolymer rubber component (a) used with a thermoplastic elastomer composition of this invention] Olefin system copolymer rubber with which an elastomer or these with which alpha olefins, such as ethylene, propylene, 1-butene, and 1-pentene, copolymerize, and nonconjugated diene copolymerize is mentioned.

[0020]As nonconjugated diene, dicyclopentadiene, 1,4-hexadiene, JISHIKURO octadien, methylene norbornene, 5-ethylidene-2-norbornene, etc. can be mentioned.

[0021][as such olefin system copolymer rubber] Specifically Ethylene propylene rubber rubber, ethylene-propylene-non-conjugated diene copolymer rubber, Ethylene system copolymer rubbers, such as ethylene-1-butene copolymer rubber, ethylene-1-butene-non-conjugated diene copolymer rubber, and ethylene-propylene-1-butene

copolymer rubber, are mentioned.

[0022]As for an ethylene content in the above-mentioned ethylene system copolymer rubber, 40 to 70 weight % is preferred, and it is 45 to 65 weight % more preferably. Machinery characteristics and a heat-resistant fall become it remarkable that an ethylene content is less than 40 weight %, and a fall of rubber elasticity becomes remarkable at the same time it will lose plasticity, if it exceeds 70 weight %.

[0023]20 or less weight % is preferred, and is 15 or less weight % more preferably, and the crystallinity of polyethylene by the DSC measurement of olefin system copolymer rubber (a) is 1 or less weight % still more preferably. If crystallinity exceeds 20 weight %, the plasticity of the thermoplastic elastomer composition obtained will fall. The compatibility of the thermoplastic elastomer composition obtained and the resin which has a polar group gets worse, and it becomes easy to produce exfoliation, modification, and a flow mark in mold goods, and the hardness of a thermoplastic elastomer composition becomes high too much, plasticity is lost, and the product of a rubber feel is not obtained.

[0024]Here, crystallinity is a value by the following measuring method.

(i) Put into the aluminum bread which found weight for the sample, and dry under the pressure of 100 Pa or less before enclosure for 24 hours.

(ii) Measure the weight of the whole sample vessel promptly after desiccation, and carry out application-of-pressure seal.

(iii) Set a sample vessel to the sample holder of DSC, and carry out temperature up to 230 ** with 10 ** the heating rate for /.

(iv) maintaining at 230 ** for 60 minutes -- a sample -- perfect -- melting -- or make it ease

(v) Cool to 30 ** at the same velocity (a part for 10 **/) as a heating rate.

(vi) The degree of perfection of the crystal generated in an isothermal crystallization process assumes that it is fixed regardless of the generation time of a crystal, and evaluate crystallinity from the heat of crystallization (ΔH_c).

(vii) Crystallinity sets the heat of crystallization (ΔH_c) of HDPE (HJ560: Japan Polychem, specific gravity 0.964) to 100, and marks the heat of crystallization (ΔH_c) of olefin system copolymer rubber (a) by weight %.

[0025]As a concrete component (a), Nordel IP 4520 (EPDM, product made by Dupont Dow Elastomers) is mentioned, for example.

[0026](2) A peroxide decomposition type olefin system resinous principle (b)

A peroxide decomposition type olefin system resinous principle (b) used with a thermoplastic elastomer composition of this invention makes good rubber dispersion of a thermoplastic elastomer composition obtained, and makes appearance of mold goods good, and it has an effect in adjustment of hardness and contraction. By heat-treating under existence of peroxide, carry out the pyrolysis of the component (b) and it reduces molecular weight moderately. It is a polymer or a copolymer of an olefin system in which flowability at the time of melting increases. For example, a copolymer with isotactic polypropylene, propylene, other alpha olefins, for example, ethylene, 1-butene, 1-hexene, 4-methyl-1-pentene, 1-octene, etc. can be mentioned.

[0027]A melting point by DSC measurement of a gay polymer portion of the above-mentioned olefin system copolymer is a thing of a range whose T_m is 150-167 ** and whose **Hm is 25 to 83 mJ/mg preferably. Crystallinity can be presumed from T_m of DSC measurement, and **Hm. Out of the range of the above [T_m and **Hm], neither the oil resistance of a thermoplastic elastomer composition obtained nor rubber elasticity at not less than 100 ** is improved.

[0028]a melt flow rate (MFR, ASTM D-1238, L conditions, 230 **) of a component (b) -- desirable -- 0.1 - 200g/-- they are 0.5-100g/10 minutes still more preferably for 10 minutes. If the moldability of a thermoplastic elastomer composition in which MFR is obtained in 0.1g/less than 10 minutes gets worse and it exceeds 200g/10 minutes, mechanical strength of a thermoplastic elastomer composition obtained will fall.

[0029]Loadings of a component (b) are 15 - 150 weight section to component (a) 100

weight section, and are 50 - 100 weight section preferably. The moldability of a thermoplastic elastomer composition in which loadings are obtained by less than 15 weight sections gets worse, and it becomes easy to produce exfoliation, modification, and a flow mark in mold goods. If 150 weight sections are exceeded, hardness of a thermoplastic elastomer composition will become high too much, plasticity will be lost, and a product of a rubber feel will not be obtained.

[0030](3) Organic peroxide component (c)

[the organic peroxide component (c) used with the thermoplastic elastomer composition of this invention] Make a radical generate, the radical is made to react continuously, it has the work over which a component (a) is made to construct a bridge, a component (b) is decomposed simultaneously, the flowability of the constituent at the time of melt kneading is increased, and it cheats out of dispersion of a rubber composition good. As a component (c), for example JIKUMIRU peroxide, di-tert-butyl peroxide, 2,5-dimethyl- 2,5-di-(tert-butylperoxy) hexane, The 2,5-dimethyl- 2,5-di-(tert-butylperoxy) hexyne- 3, 1,3-bis(tert-butylperoxy isopropyl)benzene, 1,1-bis(tert-butylperoxy)-3, 3, 5-trimethylcyclohexane, n-butyl-4,4-bis(tert-butylperoxy)valerate, Benzoyl peroxide, p-chlorobenzoyl, 2, 4-dichlorobenzoyl peroxide, tert-butylperoxy benzoate, tert-butylperoxyisopropyl, diacetyl peroxide, lauroyl peroxide, tert-butyl cumyl peroxide, etc. can be mentioned. The 2,5-dimethyl- 2,5-di-(tert-butylperoxy) hexane from a viewpoint of odor nature, coloring nature, and scorch safety and especially the 2,5-dimethyl- 2,5-di-(tert-butylperoxy) hexyne- 3 are [among these] preferred.

[0031]The loadings of a component (c) are 0.01 - 1 weight section preferably 0.01 to 3 weight section to component (a) 100 weight section. The heat-resisting property of the thermoplastic elastomer composition in which loadings cannot attain bridge formation enough, but are obtained by less than 0.01 weight sections, and mechanical strength are low. On the other hand, if three weight sections are exceeded, moldability will worsen.

[0032](4) Ester system bridge formation assistant component (d)

The ester system bridge formation assistant component (d) used with the thermoplastic elastomer composition of this invention has the effect of making uniform and efficient crosslinking reaction performing, on the occasion of the crosslinking treatment by the above-mentioned organic peroxide (c). As a component (d), for example Bird allyl cyanurate, ethylene glycol dimethacrylate, Diethylene glycol dimethacrylate, triethylene glycol dimethacrylate, The number of repeating units of tetraethylene glycol dimethacrylate and ethylene glycol Polyethylene glycol dimethacrylate of 9-14, Trimethylolpropanetrimethacrylate, allyl methacrylate, A polyfunctional methacrylate compound like 2-methyl-1,8-octanediol dimethacrylate and 1,9-nonanediol dimethacrylate, Polyethylene glycol diacrylate, 1, 6-hexanediol diacrylate, A polyfunctional vinyl compound like a polyfunctional acrylate compound like neopentyl glycol diacrylate and propylene glycol diacrylate, vinylbutyrate, or vinyl stearate can be blended. These may be independent or may be used combining two or more kinds. a polyfunctional acrylate compound or a polyfunctional methacrylate compound is preferred among the above-mentioned bridge formation assistants -- triethylene glycol dimethacrylate, tetraethylene glycol dimethacrylate, and fatty tuna -- especially methylolpropane trimethacrylate is preferred. Since this compound is easy handling, and has a solubilization operation of organic peroxide and works as a distributed assistant of organic peroxide, bridge formation by heat treatment is made uniformly and effectively, and the thermoplastic elastomer composition which the balance of hardness and rubber elasticity was able to take can be obtained.

[0033]Loadings of a component (d) are 0.01 - 10 weight section to component (a) 100 weight section, and are 0.02 - 2 weight section preferably. Loadings cannot attain bridge formation enough in less than 0.01 weight sections, but the heat-resisting property of a thermoplastic elastomer composition obtained and mechanical strength become low. On the other hand, if ten weight sections are exceeded, moldability will worsen.

[0034](5) A conjugated diene system copolymer and/or a **** conjugated diene system copolymer component (e)

Especially in a thermoplastic elastomer composition of this invention, when requiring a heat-resisting property, a conjugated diene system copolymer and/or its **** conjugated diene system copolymer component (e) can be blended if needed. A component (e) is hydrogenation or a copolymer produced by hydrogenating a part about a conjugated diene system portion in a conjugated diene system copolymer and this conjugate polymer, and the following - (e-1) (e-3) components are mentioned.

[0035](e-1), [as an aromatic vinyl compound-conjugated diene compound random copolymer used by an aromatic vinyl compound-conjugated diene compound random copolymer and/or its hydrogenation thing this invention] It is a random copolymer of a conjugated diene compound and an aromatic vinyl compound, Number average molecular weights are 5,000-1,000,000 preferably, It is 10,000-350,000 more preferably and probably a value of the degree (Mw/Mn) of powder is ten or less, and vinyl-bonds content, such as 1 of the conjugated diene part and 2 binding or 3, and 4 binding, is not less than 5%, and is 20 to 90% preferably. At less than 5%, a feel of mold goods obtained becomes hard and does not accompany the purpose of this invention. Here, content of an aromatic vinyl compound which constitutes a component (e-1) is 5 to 35 weight % preferably 50 or less weight %. A feel of mold goods which will be obtained if it exceeds 50 weight % becomes hard, and does not accompany the purpose of this invention.

[0036][as an aromatic vinyl compound in a component (e-1)] For example, styrene, t-butyl styrene, alpha-methylstyrene, p-methylstyrene, One sort or two sorts or more can be chosen from among divinylbenzene, 1,1-diphenylstyrene, N,N-diethyl- p-aminoethyl styrene, vinyltoluene, p-tertiary butyl styrene, etc., and styrene is especially preferred. As a conjugated diene compound, for example, one sort or two sorts or more are chosen from among butadiene, isoprene, 1,3-pentadiene, 2,3-dimethyl- 1,3-butadiene, etc., and butadiene, isoprene, and these combination are especially preferred.

[0037]An aromatic vinyl compound and a conjugated diene compound are combined at random, Kolthoff [I. It is preferred that an aromatic vinyl compound content of block like shape is 5 or less weight % preferably 10 or less weight % among all the joint aromatic vinyl compounds by a method of M.Kolthoff, J.Polymer Sci., and Vol 1p.429 (1946)]. A hydrogenation thing of this copolymer has that preferred to which hydrogenation of at least 90% of aliphatic double bonds based on a conjugated diene compound was carried out.

[0038]As an example of a component (e-1), a styrene butadiene random copolymer (SBR) and a hydrogenation styrene butadiene random copolymer (HSBR) can be mentioned. In this invention, SBR and HSBR may be used independently, and two or more sorts may be mixed and used.

[0039](e-2), [an aromatic vinyl compound-conjugated diene compound block copolymer and/or its hydrogenation thing component (e-2)] It is a **** block copolymer produced by hydrogenating a block copolymer which consists of at least 2 of polymeric block A which makes an aromatic vinyl compound a subject, and at least 1 of polymeric block B which makes a conjugated diene compound a subject, and this block copolymer. For example, it is a block copolymer and its **** block copolymer of an aromatic vinyl compound-conjugated diene compound which has structures, such as A-B-A, B-A-B-A, and A-B-A-B-A.

[0040]The above-mentioned (****) block copolymer (a block copolymer (****) means a block copolymer and/or a **** block copolymer hereafter.) contains an aromatic vinyl compound 20 to 50weight % preferably five to 60weight %.

[0041]Polymeric block A made into a subject an aromatic vinyl compound preferably, Whether only an aromatic vinyl compound is comprised, 50 weight % or more of aromatic vinyl compounds, It is a copolymer block of 70 weight % or more and a conjugated diene compound (hydrogenation was carried out) (a conjugated diene compound (hydrogenation was carried out) means hereafter a conjugated diene

compound and/or a conjugated diene compound by which hydrogenation was carried out) preferably.

[0042](Hydrogenation was carried out) Polymeric block B made into a subject a conjugated diene compound preferably, (Hydrogenation was carried out) Only a conjugated diene compound is comprised, or (hydrogenation was carried out) 50 weight % or more of conjugated diene compounds are a copolymer block of 70 weight % or more and an aromatic vinyl compound preferably.

[0043]In each of polymeric block A which makes these aromatic vinyl compounds a subject, and polymeric block B which makes a subject a conjugated diene compound (hydrogenation was carried out), distribution of an aromatic vinyl compound in a chain or (hydrogenation was carried out) a conjugated diene compound -- randomness and tapered (that in which a chain is met, and a monomer component increases or decreases) one -- a part -- block like shape -- or -- these -- arbitrary -- it may combine, come out and suit.

[0044]When there is two or more polymeric block B which makes a subject polymeric block A or (hydrogenation was carried out) a conjugated diene compound which makes an aromatic vinyl compound a subject, it may be structure which is different even if each is the same structure.

[0045](****) As an aromatic vinyl compound which constitutes a block copolymer, one sort or two sorts or more are chosen from among styrene, alpha-methylstyrene, vinyltoluene, p-tertiary butyl styrene, etc., for example, and styrene is especially preferred. As a conjugated diene compound, for example, one sort or two sorts or more are chosen from among butadiene, isoprene, 1,3-pentadiene, 2,3-dimethyl- 1,3-butadiene, etc., and butadiene, isoprene, and these combination are especially preferred.

[0046]Micro binding in polymeric block B which makes a conjugated diene compound a subject can be chosen arbitrarily. In a butadiene block, 1 and 2-microstructure of a maximum of a lower limit is 75% or less still more preferably 80% or less preferably 95% or less not less than 10% still more preferably not less than 5% 1% or more.

[0047][the hydrogenation rate in the **** block copolymer of a component (e-2)] In raising heat-resistant deterioration nature etc., being able to choose arbitrarily and maintaining the characteristics of a non-**** block copolymer, It is preferred that a lower limit is preferred not less than 3%, and not less than 9% and a maximum un-***** [not less than 5%] still more preferably the aliphatic double bond based on conjugated diene 60% still more preferably less than 75% still more preferably less than 80% preferably less than 85% still more preferably seven or more. It is 3% or less still more preferably 5% or less still more preferably less than 10% more preferably [0.5 to 12% has 1 after ****, and preferred 2-vinyl bonds, and].

[0048]When raising heat-resistant deterioration nature and weatherability, ***** (ing) 90% preferably is recommended not less than 80%. In a polyisoprene block, that to which this 70 to 100weight % of isoprene compound has 1 and 4-microstructure, and hydrogenation of at least 90% of the aliphatic double bonds based on this isoprene compound was carried out is preferred.

[0049]The weight average molecular weights of the **** block copolymer with which this invention which has the above-mentioned structure is presented are 5,000-1,500,000 preferably, and the ranges of them are 50,000-400,000 preferably [it is more desirable and] to 10,000-550,000, and a pan. A molecular weight distribution (ratio (Mw/Mn) of a weight average molecular weight (Mw) to a number average molecular weight (Mn)) is two or less more preferably five or less still more preferably ten or less. The molecular structure of a **** block copolymer may be any of straight chain shape, branched state, radiate, or these arbitrary combination. The molecular weight in this invention is the value which molecular weight calculated by GPC on the basis of polystyrene which is known. Therefore, this value is a relative value and about **30% of dispersion is possible in not an absolute value but a pan according to the monograph affair of GPC, such as a basis sample, a device, and a data processing method.

[0050]As for the range of the solution viscosity (a 5% toluene solution, 77 degrees F,

ASTM D-2196) of a block copolymer, 5-500 c.p.s. is preferred, and it is 20-300 c.p.s. more preferably.

[0051]Although many methods are proposed as a manufacturing method of these block copolymers, As a typical method, using a lithium catalyst or a Ziegler type catalyst, block polymerization can be carried out in an inert solvent, and it can obtain by the method written, for example in the JP,40-23798,B Description. A **** block copolymer is obtained by hydrogenating under existence of catalysts for hydrogenation in an inert solvent to the block copolymer obtained by the described method.

[0052][as an example of the above-mentioned (****) block copolymer] Styrene Butadiene Styrene (SBS), a styrene isoprene styrene copolymer (SIS), A styrene ethylenebutene-styrene copolymer (SEBS), a styrene ethylene propylene styrene copolymer (SEPS), A styrene ethyleneethylenepropylene-styrene copolymer (SEEPS), partially-hydrogenated styrene Butadiene Styrene (SBBS), etc. can be mentioned. In this invention, a ** (****) block copolymer may be used independently, may mix two or more sorts and may be used.

[0053](e-3) a conjugated diene compound block copolymer -- and -- or/-- a conjugated diene compound block copolymer used by the hydrogenation thing this invention -- and -- or/-- as the hydrogenation thing, For example, a block copolymer (CEBC) etc. which have a crystalline ethylene block and an amorphous ethylene-butene block which are acquired by hydrogenating a block copolymer of butadiene and a block copolymer of butadiene are mentioned. in this invention -- a conjugated diene compound block copolymer -- and -- or/-- the hydrogen additive thing may be used independently, may mix two or more sorts and may be used.

[0054]When blending, the loadings of a component (e) are 1 - 100 weight section to component (a) 100 weight section, and are less than 1-50 weight sections especially preferably. By less than one weight section, the addition effect is not seen for loadings. In less than 1-50 weight sections, it excels in the balance of the plasticity and surface nature which do not have surface smeariness softly especially, and is especially desirable. On the other hand, if 100 weight sections are exceeded, moldability will worsen.

[0055](6) The softener component (f) for non-aromatic system rubber
In the thermoplastic elastomer composition of this invention, the softener component for non-aromatic system rubber (f) can be blended if needed. As a component (f), the straight mineral oil of a non-aromatic system, or liquefied or the synthetic softener of low molecular weight can be mentioned. The straight-mineral-oil softener used as an object for rubber is the mixture with which three persons of an aromatic ring, a naphthene ring, and a paraffin chain combined, Not less than 30% of thing is called an aromatic system, and, as for that whose paraffin series and naphthene ring carbon number of that in which a paraffin chain carbon number has not less than 50% of the number of total carbon are 30 to 40%, the naphthene system and the number of aromatic carbon are distinguished.

[0056]The softener for straight-mineral-oil system rubber used as a component (f) of this invention is a thing of paraffin series and a naphthene system in a Type. Since the softener of an aromatic system cannot aim at improvement in the physical properties of the constituent obtained by a component's (a's)'s becoming meltable by the use, and checking crosslinking reaction, it is not preferred. As a component (f), especially the thing that has a few aromatic ring component is suitable also in paraffin series preferably [the thing of paraffin series]. Liquefied or polybutene, hydrogenation polybutene, low-molecular-weight polyisobutylene, etc. are mentioned as a synthetic softener of low molecular weight.

[0057]As for description of these softeners for non-aromatic system rubber, it is preferred that dynamic viscosity [in / in dynamic viscosity at 37.8 ** / 20 - 50000cSt and 100 **] shows 5 - 1500cSt, a pour point shows -10--15 **, and a flash point (COC) shows 170-300 **. A thing of 100-2,000 has a preferred weight average

molecular weight.

[0058]When blending, loadings of a component (f) are 1 - 100 weight section to component (a) 100 weight section, and are 1 - 15 weight section preferably. If loadings do not have the improvement effect and exceed 100 weight sections in less than one weight section, it will be easy to carry out bleed out of the softener from a thermoplastic elastomer composition obtained, and will become easy to produce exfoliation, modification, and a flow mark in mold goods.

[0059](7) A silicone oil component (g)

In a thermoplastic elastomer composition of this invention, a silicone oil component (g) can be blended if needed. A component (g) demonstrates an effect of improving the surface tackiness of mold goods which used a thermoplastic elastomer composition of this invention. As a component (g), dimethyl silicone oil, methylphenyl silicone oil, methyl hydrogen silicone oil, or denaturation silicone oil containing other organic groups can be mentioned. As for a weight average molecular weight of silicone oil, 5,000-50,000 are preferred, and they are 10,000-20,000 more preferably. In a weight average molecular weight, bleed out becomes remarkable by less than 5,000. Or more by 50,000, distributed [poor] occurs and machinery characteristics get worse. 100 - 2,000cSt is suitable for viscosity of silicone oil at 23 **.

[0060]When blending, loadings of a component (g) have 1 - 20 preferred weight section to component (a) 100 weight section, and are 2 - 10 weight section more preferably. Even if it blends exceeding 20 weight sections, there are few especially further improvements and bleed out becomes remarkable.

[0061](8) An inorganic bulking agent component (h)

In a thermoplastic elastomer composition of this invention, an inorganic bulking agent component (h) can be blended if needed. A component (h) has an advantage on economy by increase in quantity besides an effect of improving some [, such as a compression set etc. of mold goods obtained from a thermoplastic elastomer composition,] physical properties. As a component (h), chlorite, calcium carbonate, a talc, silica, diatomaceous earth, Barium sulfate, magnesium carbonate, magnesium hydroxide, mica, clay, titanium oxide, carbon black, glass fiber, a hollow glass balloon, carbon fiber, a titanic acid calcium fiber, a natural silicic acid, a synthetic silicic acid (white carbon), etc. are mentioned. Chlorite, calcium carbonate, and especially a talc are [among these] preferred.

[0062]When blending, loadings of a component (h) have 1 - 100 preferred weight section to component (a) 100 weight section, and are 20 - 80 weight section more preferably. If loadings exceed 100 weight sections, a fall of mechanical strength of a thermoplastic elastomer composition obtained is remarkable, and hardness will become high, plasticity will be lost, and a product of a rubber feel will no longer be obtained.

[0063](9) Other component (i)s

To a thermoplastic elastomer composition of this invention, it is also possible to contain various kinds of antiblocking agents, a sealing nature improving agent, a thermostabilizer, an antioxidant, light stabilizer, an ultraviolet ray absorbent, lubricant, a nucleus agent, a colorant, etc. other than the above-mentioned component if needed further. As an antioxidant, here, for example 2,6-di-tert-p-butyl-p-cresol, 2,6-di-tert-butylphenol, 2,4-dimethyl- 6-tert-butylphenol, Phenolic antioxidants, such as 4,4-dihydroxydiphenyl and tris (2-methyl-4-hydroxy-5-tert-buthylphenyl) butane, a phosphite system antioxidant, a thioether series antioxidant, etc. are mentioned. Among these, a phenolic antioxidant and especially a phosphite system antioxidant are preferred. 0 - 3.0 weight section is desirable especially preferred to a total of 100 weight sections of above-mentioned component (a) - (h), and an antioxidant is 0.1 - 1.0 weight section.

[0064]2. a thermoplastic elastomer composition of manufacture this invention of a thermoplastic elastomer composition accepts above-mentioned component (a) - (d) or necessity -- a component (e) - (i) -- in addition, it can manufacture by adding each component to simultaneous or arbitrary order, and carrying out melt kneading.

[0065]Restriction in particular does not have a method of melt kneading, and a publicly known method can usually be used for it. For example, a single screw extruder, a twin screw extruder, a roll, a Banbury mixer, or various kinds of kneaders can be used. For example, the above-mentioned operation can also be continuously performed by using a twin screw extruder of moderate ratio of length to diameter, a Banbury mixer, a pressurized kneader, etc. Here, temperature of melt kneading is 160-220 °C preferably.

[0066]3., [a thermoplastic elastomer composition of use this invention of a thermoplastic elastomer composition] Since it excels in multilayer extrusion (injection) moldability with polyolefin resin or styrene resin, bleeding-proof nature, a heat-resistant deformable (compression set) one, oil resistance, and a sex with a crack-proof, It can be used for a skin material or a core material of building components, such as automobile interior members, such as a trim, the Graslin channel, a weather strip, and a mall, a joint, and a window frame, or a household appliance member.

[0067]
[Working example]Although the following work examples and a comparative example explain this invention concretely, this invention is not limited only to these work examples. A measuring method and a sample of physical properties which were used by this invention are shown below.

[0068]1. Property measuring method (1) specific gravity : it measured based on JIS K 7112.

(2) Hardness : based on JIS K 6253, the specimen used the 6.3-mm thickness press sheet.

(3) Tensile strength : based on JIS K 6251, the specimen pierced and used the 1-mm thickness press sheet for the No. 3 type with the dumbbell. The speed of testing was considered as a part for 500-mm/min. (It measures at a room temperature and 100 °C)

(4) 100% elongation stress : based on JIS K 6251, the specimen pierced and used the 1-mm thickness press sheet for the No. 3 type with the dumbbell. The speed of testing was considered as a part for 500-mm/min.

(5) Elongation after fracture : based on JIS K 6251, the specimen pierced and used the 1-mm thickness press sheet for the No. 3 type with the dumbbell. The speed of testing was considered as a part for 500-mm/min.

(6) Volume change : based on JIS K 6258, the specimen pierced and used the 1-mm thickness press sheet for the No. 3 type with the dumbbell. Gasoline was used and the weight change of room temperature x 72 hours was measured.

(7) Compression set (CS%) : based on JIS K 6262, the specimen used the 6.3-mm thickness press sheet. On condition of modification, it measured 25% in 100 °C x 22 hours.

(8) Extrusion nature : extrusion of the sheet (50 mm x 1 mm) was carried out, drawdown nature, surface appearance, and shape were observed, and the following basis estimated.

O : -- good x: -- bad (9) injection-molding nature: -- a 130mmx130mmx2mm sheet was injection molded, the appearance was observed by viewing, and the following basis estimated existence of a flow mark and a HIKE development.

O : -- good x: -- bad bleeding-proof [(10)] nature: -- an extrusion sheet which was bent and was fixed with a clip was neglected in a room temperature and 110 °C atmosphere for 168 hours, bleeding of a low-molecular-weight thing and existence of blooming were observed by viewing, and the following basis estimated.

O : -- good x: -- bad [0069]Sample (1) olefin-system copolymer rubber (a):Nordel IP 4520 (made by EPDM;Dupont DowElastomers) ethylene content used in a work example and a comparative example; 2. 50 weight %, Crystallinity; (Two) 1% or less peroxide decomposition type polypropylene component (b):PP-BC8 (a trademark; made by Japan Polychem, Inc.), Crystallinity: Tm166 °C, ΔHm82mJ/mg, MFR1.8g/10min (3) 10-minute organic peroxide component (c):par hexa 25B (a trademark; made by NOF CORPORATION)

(4) Bridge formation assistant component (d):TMPT (Trimethylol Propane

Trimethacrylate; made by Aranaka village chemicals incorporated company) molecular weight : 338(5) SBS block copolymer component (e):VECTOR2518 (DEXCO.) [A trademark;] Styrene content by POLYMERS: The 30 weight % solution viscosity of 75 c.p.s. (a 5% toluene solution, 77 degrees F, ASTM D-2196)

(6) A softener component (f) : Diana process oil PW-90 (a trademark; made by IDEMITSU KOSAN CO. LTD.)

(7) A silicone oil component (g) :SH200 (made by Dow Corning Toray Silicone), viscosity 1000cSt(8) calcium-carbonate component (h):NS400 (a trademark; made by Sankyo fine powder incorporated company)

(9) Hindered phenol / phosphite / lactone system compound antioxidant component (i): HP2215 (a trademark; made in Tiba Speciality Chemicals)

[0070]Using each component of quantity shown in one to work-examples 1-3 and comparative example 6 Table 1 and 2, it supplied to a twin screw extruder of 47, and with kneading temperature of 180 **, and a screw speed of 350 rpm, ratio of length to diameter carried out melt kneading, and pelletized. Next, an obtained pellet was injection molded, a specimen was created and each examination was presented. An evaluation result is shown in Table 1 and 2.

[0071]

[Table 1]

			実施例		
			1	2	3
成分組成	成分 (a) EPDM	重量部	100	100	100
	成分 (b) PP	重量部	65	65	65
	成分 (c) Peroxide	重量部	0.05	0.05	0.05
	成分 (d) TMPT	重量部	0.10	0.10	0.10
	成分 (e) SBS	重量部	0	10	10
	成分 (f) PW90	重量部	0	5	5
	成分 (g) Silicon oil	重量部	0	0	3
	成分 (h) CaCO ₃	重量部	65	65	65
	成分 (i) Antioxidant	重量部	0.4	0.4	0.4
評価結果	比重成分		1.09	1.08	1.08
	硬度成分		60	56	56
	引張強さ (室温)	MPa	5.5	6.7	5.6
	引張強さ (100℃)	MPa	1.0	1.3	1.2
	100%応力	MPa	2.1	2.3	2.0
	破断伸び	%	460	520	490
	体積変化率 (耐熱*リソ)	%	-28	-35	-33
	C S %(100℃、22hr 後)	%	65	53	55
	押出成形性		○	○	○
	射出成形性		○	○	○
	耐ブリード性		—	○	○

[0072]

[Table 2]

			比較例					
			1	2	3	4	5	6
成分組成	成分 (a) EPDM	重量部	100	100	100	100	100	100
	成分 (b) PP	重量部	10	160	65	65	65	65
	成分 (c) Peroxide	重量部	0.05	0.05	0	3.5	0.05	0.05
	成分 (d) TMPT	重量部	0.10	0.10	0.10	0.10	0	12
	成分 (e) SBS	重量部	0	0	0	0	0	0
	成分 (f) PW90	重量部	0	0	0	0	0	0
	成分 (g) Silicon oil	重量部	0	0	0	0	0	0
	成分 (h) CaCO ₃	重量部	65	65	65	65	65	65
	成分 (i) Antioxidant	重量部	0.4	0.4	0.4	0.4	0.4	0.4
評価結果	比重成分		1.11	1.08	1.09	1.10	1.09	1.10
	硬度成分		47	95	50	75	58	72
	引張強さ (室温)	MPa	2.7	8.9	5.1	2.1	4.8	4.2
	引張強さ (100℃)	MPa	—	2.5	—	1.2	0.5	0.4
	100%応力	MPa	—	2.7	0.2	—	3.1	1.4
	破断伸び	%	80	480	280	70	120	170
	体積変化率 (耐ガソリン)	%	—45	—18	—50	—23	—25	—21
	C S % (100℃、22hr 後)	%	88	95	98	45	83	81
	押出成形性	—	×	×	×	×	×	×
	射出成形性	—	×	○	○	×	○	×
	耐ブリード性	—	—	—	—	—	—	—

[0073]The work examples 1-3 are the thermoplastic elastomer compositions of this invention so that more clearly than Table 1 and 2. Component (e) which is an optional component Description with any good thermoplastic elastomer composition was shown irrespective of the existence of - (h).

[0074]On the other hand, the comparative examples 1 and 2 carry out the loadings of a component (b) out of the range of this invention. If there are few components (b), machinery characteristics will fall and moldability will get worse. If there are many components (b), it will become hard too much and extrusion nature will get worse. The comparative examples 3 and 4 carry out the loadings of a component (c) out of the range of this invention. If there are few components (c), oil resistance, a heat-resisting property, and moldability will get worse, if there are many components (c), machinery characteristics will fall and moldability will get worse. The comparative examples 5 and 6 carry out the loadings of a component (d) out of the range of this invention. If there are few components (d), efficient bridge formation will not be performed, but machinery characteristics, a heat-resisting property, and moldability will get worse, and if there are many components (d), machinery characteristics and moldability will be spoiled.

[0075]
[Effect of the Invention]Since the thermoplastic elastomer composition of this invention is excellent in multilayer extrusion (injection) moldability with polyolefin resin or styrene resin, bleeding-proof nature, a heat-resistant deformable (compression set) one, oil resistance, and a sex with a crack-proof, It can be used for the skin material or core material of building components, such as automobile interior members, such as a trim, the Graslin channel, a weather strip, and a mall, a joint, and a window frame, or a household appliance member.

[Translation done.]

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